

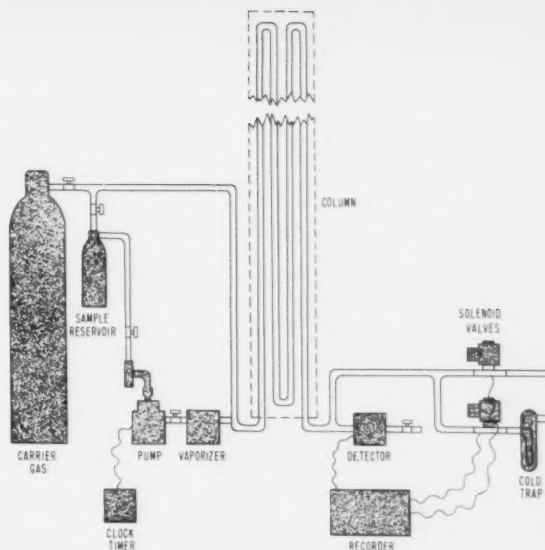
ethylene glycol, are connected in a series to produce a column 9 m long.

As the gas emerges from the column, the components are detected by the hot wire thermal conductivity unit. By means of a small needle valve, the flow of the gas is adjusted so that about one percent of the total effluent from the column passes through the detector. The rest of the stream is carried to two solenoid valves controlled by a microswitch mounted on the recording potentiometer. When the major component causes the recorder pen to reach a predetermined position on the scale, the solenoid valves are activated through a relay. This action directs the desired component through one of the valves into a cold trap where it is cooled to its liquid state. Then when the recorder pen has returned to the activation point, the remaining portion of the sample (including some of the impurities) is vented to the atmosphere through the other valve. At a predetermined time, the next aliquot is injected and the purification cycle repeated. During weeks of continuous use, no difficulty due to drift of the base line of the recorder was experienced.

To check the effectiveness of the apparatus, the Bureau used it to purify toluene and ethylbenzene. From freezing-point analysis, the purity of 80 ml of toluene, collected at a rate of 25 ml per day, was found to have increased from 99.4 to 99.95 mole percent, whereas the purity of 70 ml of ethylbenzene, purified at a rate of 13 ml per day, was increased from 99.1 to 99.8 mole percent.

A complex mixture of mesitylene containing many impurities was found to be more difficult to purify. However, after two separations with the automatic apparatus, chromatographic analysis indicated the purity was substantially increased.

Before the preparative-scale chromatograph can be operated continuously for long periods, the appropriate chromatographic column, column temperature, and gas-flow rate for the specific separation must be determined. Experiments must be carried out to determine



Automatic gas-chromatographic apparatus developed for purifying materials. The apparatus includes automatic, timed sample injection, and automatic collection governed only by the selected peak height, which is indicated on the associated recorder.

the time that will be required for each cycle, the sensitivity setting of the detector that will permit only the peak due to the major component to activate collection, and the maximum quantity of sample that may be processed without overloading the column. Work is being continued to increase the efficiency and versatility of the process by appropriate changes in the variables involved.

¹ For example, see D. Ambrose and R. R. Collerson, *Nature* **177**, 323 (1956).

INDEX TO TECHNICAL NEWS BULLETIN—VOLUME 45, 1961

A	Page
Accuracy of pH standards increased (Dec.)	205
Accurate thermal voltage converters (June)	98
Advisory committees established, two technical (Jan.)	16
Advisory panels, Foote named coordinator of NBS (Jan.)	15
Alkyl radical reactions (Nov.)	192
Allen, Kushner, Hudson named division chiefs (Dec.)	204
Alloys for low-temperature bonding, gallium (Jan.)	5
Ambler receives Flemming award (June)	107
Amides, electrolysis of simple (July)	115
AMOS IV computer for a prototype automatic weather station (Jan.)	13
Analog simulation of zone melting (Nov.)	181
Announcement of new publication: Precision measurement and calibration (Jan.)	17
Antarctica named for Boulder scientist, point in (May)	88
Antenna, oblique-incidence riometer (Nov.)	193
Antennas for detecting micropulsations (May)	83
Apparatus for vacuum evaporations (Feb.)	30
Atmosphere and outer space, scatter radar investigation of upper (Oct.)	163
Atmospheric research reported (Sept.)	158
Atomic frequency standards (Jan.)	8
Atomic transition probabilities and collision cross sections, new data center on (Sept.)	151
Auroral fluctuations, study of (Sept.)	145
Automatic purification by preparative-scale chromatography (Dec.)	212
Automatic weather station, AMOS IV computer for a prototype (Jan.)	13
Award, Ambler receives Flemming (June)	107
Awarded IES gold medal, Judd (Nov.)	196
Awards, gold medal exceptional service, go to nine staff members (June)	104

B	Page
Black void reactor concept (Aug.)	128
Boulder scientist, point in Antarctica named for (May)	88
Brass, residual stresses in and the Bauschinger effect (Dec.)	199
Breaks ground for new NBS laboratories, Commerce Secretary (Aug.)	131
Broadcasts, changes in WWV/WWVH standard (Jan.)	11
Building Research Committee, Folsom to head NAS-NRS (Sept.)	155
Buildings, pipe sizes for plumbing stacks in (Aug.)	140
C	Page
Calibration, announcement of new publication: precision measurement and (Jan.)	17
Calibration of gage blocks (Feb.)	26
Calibration of inductive voltage dividers (May)	73
Calibration of microphones (Nov.)	188
Calibration of optical pyrometers (Nov.)	184
Calibration of platinum resistance thermometers (Apr.)	62
Calibration service, microwave impedance (Aug.)	136
Calibrations, thermocouple (Mar.)	44
Carbon 14, redetermination of the half-life of (Feb.)	21
Cells discontinued, certification of unsaturated standard (July)	124
Cement, fourth international symposium on the chemistry of (Feb.)	32
Certification of unsaturated standard cells discontinued (July)	121
Changes in WWV/WWVH standard broadcasts (Jan.)	11
Chemistry division reorganization announced (Feb.)	34
Chemistry of cement, fourth international symposium on the (Feb.)	32
Chromatography, automatic purification by preparative-scale (Dec.)	212
Chromatography, low-level carbonate determination by gas phase (Oct.)	177
Coatings formed by cathodic protection, study of (Sept.)	156

	Page
Cobalt 60 source, 50,000 curie (June).....	92
Colorimetry, improved standard observer for (Nov.).....	183
Combustion reactions, inhibition of (July).....	122
Commerce Secretary breaks ground for new NBS laboratories (Aug.).....	131
Committees established, two technical advisory (Jan.).....	16
Computer for a prototype automatic weather station, AMOS IV (Jan.).....	13
Conference on weights and measures, 46th national (Aug.).....	142
Conferences, measurement research (Jan.).....	1
Construction bids sought for new laboratories, first (May).....	84
Convective currents in water, study of (June).....	91
Copolymer composition, determination of (Mar.).....	42
Copper, growth rate of oxide films on (Aug.).....	134
Cross linkage of natural rubber (Feb.).....	31
Crystals from the vapor phase, growth of metal (Aug.).....	130
Crystals with folded chains, polymer (Aug.).....	129

D

Data center on atomic transition probabilities and collision cross sections, new (Sept.).....	151
Determination of copolymer composition (Mar.).....	42
Determination of iron, aluminum, titanium, and zirconium, separation and (May).....	76
Diamond, high-temperature heat capacity of (Sept.).....	146
Dielectric specimen holder, improved (Dec.).....	210
Disturbances in a two-layer liquid system (Sept.).....	154
Dosimeter extended, range of ferrous sulfate (Dec.).....	203

E

Effect of dodecyl alcohol on fatigue crack propagation (Oct.).....	178
Electrode reactions, relaxation theory applied to (Nov.).....	182
Electrolysis of simple amides (July).....	115
Electron densities from line broadening measurements, plasma temperatures and (July).....	109
Electron dose from a narrow beam source, fast (Aug.).....	139
Electron emission in the field emission region, temperature dependence of (Nov.).....	195
Electron filter lens, improved (Oct.).....	168
Ephi—a radio system for investigating sferics (Apr.).....	60
Equations representing steel expansion (Apr.).....	72
Ethane, photolysis of (Mar.).....	51

F

Fast electron dose from a narrow beam source (Aug.).....	139
Fatigue crack propagation, effect of dodecyl alcohol on (Oct.).....	178
Fifty-thousand-curie cobalt 60 source (June).....	92
Fires involving liquids, small models aid studies of extinction of (July).....	120
First construction bids sought for new laboratories (May).....	84
Fleming Award, Ambler receives (June).....	107
Folsom to head NAS-NRS building research committee (Sept.).....	157
Foot named coordinator of NBS advisory panels (Jan.).....	15
Forty-sixth national conference on weights and measures (Aug.).....	142
Fourth international symposium on the chemistry of cement (Feb.).....	32
Fourth temperature symposium (June).....	105
Frequency standards, atomic (Jan.).....	8
Frustrated total reflection—its application to proximity problems in metrology (July).....	110

G

Gate blocks, calibration of (Feb.).....	26
Gallium alloys for low-temperature bonding (Jan.).....	5
Gamma radiation, ozone formation by (June).....	96
Gamma-ray calibration, X- and (July).....	116
Gas phase chromatography, low-level carbonate determination by (Oct.).....	177
Geomagnetic storm forecast by NBS (Sept.).....	160
Gold medal exceptional service awards go to nine staff members (June).....	104
Growth of metal crystals from the vapor phase (Aug.).....	130
Growth rate of oxide films on copper (Aug.).....	134

H

Hafnium from zirconium, separation of (Aug.).....	137
He ³ refrigerator, portable (Aug.).....	132
High-flux research reactor for new NBS site (Aug.).....	127
High-pressure polymerization induced by gamma radiation (Dec.).....	206
High-purity trimethylborane (June).....	99
High-speed three-color pyrometer (Sept.).....	148
High-temperature heat capacity of diamond (Sept.).....	146
High voltage section, Kotter chief of new (Dec.).....	208
Hudson named division chiefs, Allen, Kushner, (Dec.).....	204
Hydrogen bonding in hydroxapatites (Apr.).....	67
Hydrogen-in-titanium, standard samples of, standard materials: (Oct.).....	169

I

Improved dielectric specimen holder (Dec.).....	210
Improved electron filter lens (Oct.).....	168
Improved standard observer for colorimetry (Nov.).....	183
Information searching, new microcite machine for large-scale (July).....	113
Inhibition of combustion reactions (July).....	122
Interferometer, millimeter wave Fabry-Perot (Oct.).....	166
International practical temperature scale (Apr.).....	65
Ion studies, negative (Apr.).....	55
Ionization chamber for determination of total X-ray beam energy (Dec.).....	209

J

Joint URSI-IRE fall 1960 meeting (Mar.).....	40
Judd awarded IES gold medal (Nov.).....	196

K

Kotter chief of new high voltage section (Dec.).....	208
Kushner, Hudson named division chiefs, Allen (Dec.).....	204

L

Lenses, measuring resolving power in precision (Apr.).....	70
Lenses, plane of best average definition for (Feb.).....	21
Liquid system, disturbances in a two-layer (Sept.).....	154
Low-level carbonate determination by gas phase chromatography (Oct.).....	177
Low-level radioactivity laboratory established (May).....	81
Low-temperature bonding, gallium alloys for (Jan.).....	5
Low-temperature reaction in copper-oxygen system (Apr.).....	61
Luminance standards (May).....	75

M

Materials, standard:	
Hydrocarbon blends (June).....	102
Metallo-organic standard sample (Mar.).....	50
Microcopy resolution test chart (Feb.).....	24
Radionuclides (Feb.).....	24
Radionuclides (Dec.).....	205
Standard for measuring the pH of blood (July).....	119
Standard samples of hydrogen-in-titanium (Oct.).....	169
Surface flammability standard (May).....	82
Thermometric cells (Mar.).....	50
Two radioactivity standard materials (Sept.).....	149
Measure and calibration, announcement of new publication:	
Precision (Jan.).....	17
Measurement of flow and elastic recovery, viscoelastometer for (May).....	78
Measurement of intragranular misorientation in metals, X-ray (Feb.).....	19
Measurement research conferences (Jan.).....	1
Measurements, plasma temperature and electron densities from line broadening (July).....	109
Measuring the pentosans and carboxyl content of cellulose, survey of methods for (Aug.).....	138
Measuring the pH of blood, standard materials: a standard for (July).....	119
Measuring resolving power in precision lenses (Apr.).....	70
Meeting, joint URSI-IRE fall 1960 (Mar.).....	40
Metal crystals from the vapor phase, growth of (Aug.).....	130
Metal foils, method for determining the mechanical properties of (Nov.).....	194
Metallurgical systems, phase-equilibrium studies in (Oct.).....	170
Metals, X-ray measurement of intragranular misorientation in (Feb.).....	19
Method for determining the mechanical properties of metal foils (Nov.).....	194
Metrology, frustrated total reflection—its application to proximity problems in (July).....	110
Microcite machine for large-scale information searching, new (July).....	113
Microphones, calibration of (Nov.).....	188
Micropulsations, antennas for detecting (May).....	83
Microwave impedance calibration service (Aug.).....	136
Millimeter wave Fabry-Perot interferometer (Oct.).....	166

N

NBS marks sixty years (Mar.).....	37
NBS postdoctoral research associateship appointees announced (Nov.).....	186
Negative ion studies (Apr.).....	55
Neutron flux, recalibration of standard thermal (Mar.).....	43
New data center on atomic transition probabilities and collision cross sections (Sept.).....	151
New microcite machine for large-scale information searching (July).....	113

O

Oblique-incidence riometer antenna (Nov.).....	193
Optical study of supersonic boundary-layer transition (Apr.).....	57
Ozone formation by gamma radiation (June).....	96

P

pH standards increased, accuracy of (Dec.).....	205
Phase angle master standard (Sept.).....	150
Phase-equilibrium studies in metallurgical systems (Oct.).....	170
Photoelectric pyrometer developed (Oct.).....	165
Photolysis of ethane (Mar.).....	51
Pipe sizes for plumbing stacks in buildings (Aug.).....	140
Plane of best average definition for lenses (Feb.).....	21
Plasma temperature and electron densities from line broadening measurements (July).....	109
Plumbing stacks in buildings, pipe sizes for (Aug.).....	140
Point in Antarctica named for Boulder scientist (May).....	88
Polymer crystals with folded chains (Aug.).....	129
Polymerization induced by gamma radiation, high-pressure (Dec.).....	206
Polymorphism of rare-earth borates (May).....	80
Portable He ³ refrigerator (Aug.).....	132
Postdoctoral research associateship appointees announced, NBS (Nov.).....	186
Postdoctoral research associateships (Mar.).....	52
Precision measurement and calibration, announcement of new publication (Jan.).....	17
Preparative-scale chromatography, automatic purification by (Dec.).....	212
Problem of windstorm damage to asphalt shingles (Apr.).....	68
Program announced for 1961 temperature symposium (Jan.).....	7
Properties of metal foils, method for determining the mechanical (Nov.).....	191
Publishing: Precision measurement and calibration, announcement of new (Jan.).....	17
Purification, automatic, by preparative-scale chromatography (Dec.).....	212
Pyrometer developed, photoelectric (Oct.).....	165
Pyrometer, high-speed three-color (Sept.).....	148
Pyrometers, calibration of optical (Nov.).....	184

R

Radiation field from a rectangular source (Mar.).....	48
Radical reactions, alkyl (Nov.).....	192
Radio system for investigating sferics, Ephi—a (Apr.).....	60
Radioactivity laboratory established, low-level radioactivity (May).....	81

	Page
Radioactivity standard materials, two standard materials (Sept.)	149
Radiionuclide standard materials issued (Dec.)	205
Range of ferrous sulfate dosimeter extended (Dec.)	203
Rare-earth borates, polymorphism of (May)	80
Rate of the reaction $\text{NO} + \text{N}$ (Aug.)	139
Reaction $\text{NO} + \text{N}$, rate of the (Aug.)	139
Reactor concept, black void (Aug.)	128
Reactor for new NBS site, high-flux research (Aug.)	127
Recalibration of standard thermal neutron flux (Mar.)	43
Redetermination of the half-life of carbon 14 (Feb.)	21
Redetermination of NBS unit of resistance by new method (Oct.)	164
Relaxation theory applied to electrode reactions (Nov.)	182
Reorganization announced, chemistry division (Feb.)	34
Research reactor for new NBS site, high-flux (Aug.)	127
Resistance by new method, redetermination of NBS unit of (Oct.)	164
Riometer antenna, oblique-incidence (Nov.)	193
Rubber, cross linkage of natural (Feb.)	31

S

Scatter radar investigation of upper atmosphere and outer space (Oct.)	163
Separation and determination of iron, aluminum, titanium, and zirconium (May)	76
Separation of hafnium from zirconium (Aug.)	137
Sferics, Ephi-a radio system for investigating (Apr.)	60
Shingles, problem of windstorm damage to asphalt (Apr.)	68
Simulation of zone melting, analog (Nov.)	181
Sixty years, NBS marks (Mar.)	37
Small models aid studies of extinction of fires involving liquids (July)	120
Space, scatter radar investigation of upper atmosphere and outer (Oct.)	163
Spectral-line intensity tables (Dec.)	201
Standard cells discontinued, certification of unsaturated (July)	124
Standard materials:	
Hydrocarbon blends (June)	102
Metallo-organic standard sample (Mar.)	50
Microcopy resolution test chart (Feb.)	24
Radiionuclides (Feb.)	24
Radiionuclides (Dec.)	205
Standard for measuring the pH of blood (July)	119
Standard samples of hydrogen-in-titanium (Oct.)	169
Surface flammability standard (May)	82
Thermometric cells (Mar.)	50
Two radioactivity standard materials (Sept.)	149
Standard materials issued, radiionuclide (Dec.)	205
Standard observer for colorimetry, improved (Nov.)	183
Standard, phase angle master (Sept.)	150
Standard thermal neutron flux, recalibration of (Mar.)	43
Standards, atomic frequency (Jan.)	8
Standards increased, accuracy of pH (Dec.)	205
Standards, luminance (May)	75
Steel expansion, equations representing (Apr.)	72
Structural modification of synthetic fibers (Sept.)	152
Study of aural fluctuations (Sept.)	145
Study of coatings formed by cathodic protection (Sept.)	156
Study of convective currents in water (June)	91
Successive irradiation of X-ray film (June)	95

	Page
Supersonic boundary-layer transition, optical study of (Apr.)	57
Survey of methods for measuring the pentosans and carboxyl content of cellulose (Aug.)	138
Symposium on the chemistry of cement, fourth international (Feb.)	32
Symposium, program announced for 1961 temperature (Jan.)	7
Synthetic fibers, structural modification of (Sept.)	152
System for describing visual appearance (June)	93

T

Tables, spectral-line intensity (Dec.)	201
Temperature dependence of electron emission in the field emission region (Nov.)	195
Temperature heat capacity of diamond, high- (Sept.)	146
Temperature reaction in copper-oxygen systems, low- (Apr.)	61
Temperature scale, international practical (Apr.)	65
Temperature symposium, fourth (June)	105
Temperature symposium, program announced for 1961 (Jan.)	7
Thermocouple calibrations (Mar.)	44
Thermometers, calibration of platinum resistance (Apr.)	62
Time adjustment in WWV and WWVH standard broadcasts (Sept.)	157
Two technical advisory committees established (Jan.)	16

U

Ultra-low conductivity water (June)	100
Unit of resistance by new method, redetermination of NBS (Oct.)	164
Upper atmosphere and outer space, scatter radar investigation of (Oct.)	163
URSI-IRE fall 1960 meeting, joint (Mar.)	40

V

Vacuum evaporations, apparatus for (Feb.)	30
Viscoelastometer for measurement of flow and elastic recovery (May)	78
Visual appearance, system for describing (June)	93
Voltage converters, accurate thermal (June)	98
Voltage dividers, calibration of inductive (May)	73

W

Water, ultra-low conductivity (June)	100
Weights and measures, 46th national conference on (Aug.)	142
Windstorm damage to asphalt shingles, problem of (Apr.)	68
WWV/WWVH standard broadcasts, changes in (Jan.)	11
WWV and WWVH standard broadcasts, time adjustment in (Sept.)	157

X

X- and gamma-ray calibration (July)	116
X-ray barrier determinations (Apr.)	66
X-ray beam energy, ionization chamber for determination of total (Dec.)	209
X-ray film, successive irradiation of (June)	95
X-ray measurement of intragranular misorientation in metals (Feb.)	19

Z

Zirconium, separation of hafnium from (Aug.)	137
--	-----

Publications of the National Bureau of Standards

Periodicals

Technical News Bulletin, Volume 45, No. 11, November 1961. 15 cents. Annual subscription: \$1.50. 75 cents additional for foreign mailing. Available on a 1-, 2-, or 3-year subscription basis.

Basic Radio Propagation Predictions for February 1962. Three months in advance. CRPL-207, issued November 1961. 15 cents. Annual subscription \$1.50, 50 cents additional for foreign mailing. Available on a 1-, 2-, or 3-year subscription basis.

Journal of Research of the National Bureau of Standards
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Current Issues of the Journal of Research

Section A. Physics and Chemistry, Vol. 65A, No. 6, November-December 1961.
 Comparison of lens response for sinusoidal and square-wave targets at several focal positions. Sayeda H. Emara.
 Wavelength shifts in Hg^{100} as a function of temperature. Sayeda H. Emara.
 Variability of spectral tristimulus values. Isadore Nimeroff, Joan R. Rosenblatt, and Mary C. Dannemiller.

December 1961

Extension of the Flory-Rehner theory of swelling to an anisotropic polymer system. Stephen D. Bruck.
 Fiber structure-property relationships: a disulfide-crosslinked self-crimping polyamide. Stephen D. Bruck.
 Acidity functions. Values of the quantity $p(\text{HClY})$ for buffer solutions from 0 to 95 °C. Roger G. Bates and R. Gary.
 2,3-Isopropylidene- α -D-lyxofuranose, the monoacetone-D-lyxose of Levene and Tipson. Robert Schaffer.

Effect of perchloryl fluoride additions on the flame speed of methane. Carl Halpern.

Section B. Mathematics and Mathematical Physics, Vol. 65B, No. 4, October-December 1961.

Physical entities and mathematical representation. C. H. Page.
 On the range of a fleet of aircraft. A. J. Goldman.
 Measurement of wave fronts without a reference standard: Part I. The wave-front-shearing interferometer. James B. Saunders.

On the evaluation of the function $\Phi(\lambda) =$

$$\frac{1}{2\pi i} \int_{\sigma-i\infty}^{\sigma+i\infty} e^{u \ln u + \lambda u} du$$

for real values of λ . Wolfgang Börsch-Supan.

Analyticity and probability properties of one-dimensional Brownian motion. Abolghassem Ghaffari.

Some higher order integral identities with application to bounding techniques. J. H. Bramble and B. E. Hubbard.

A priori bounds in the first boundary value problem in elasticity. J. H. Bramble and L. E. Payne.

Section C. Engineering and Instrumentation, Vol. 65C, No. 4, October-December 1961.